TRIGONOMETRY TO MEMORIZE FOR CALCULUS

"Special" Angles

θ in radians	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$
θ in degrees	30º	45º	60º
sin θ	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
cos θ	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
tan θ	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

Identities

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{\cos\theta}{\sin\theta} \qquad \csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$\sin\frac{\theta}{2} = \pm\sqrt{\frac{1-\cos\theta}{2}} \to \sin^2 A = \frac{1}{2} - \frac{1}{2}\cos 2A$$

$$\cos\frac{\theta}{2} = \pm\sqrt{\frac{1+\cos\theta}{2}} \to \cos^2 A = \frac{1}{2} + \frac{1}{2}\cos 2A$$

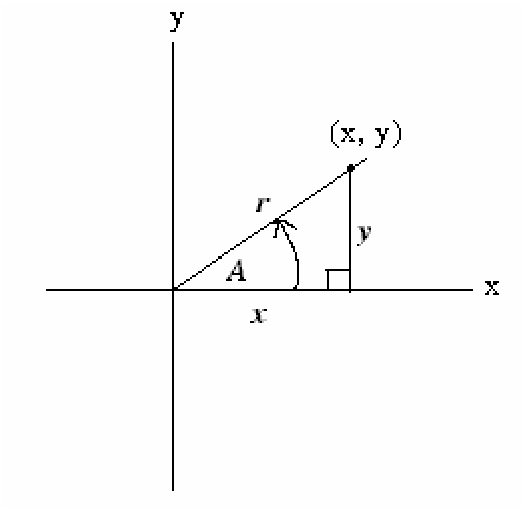
Inverse Trig

$$\left.\begin{array}{l}\theta = \arcsin x \\ \theta = \sin^{-1} x\end{array}\right\} \leftrightarrow \sin\theta = x \text{ and } -90° \le \theta \le 90°$$

$$\left.\begin{array}{l}\theta = \arccos x \\ \theta = \cos^{-1} x\end{array}\right\} \leftrightarrow \cos\theta = x \text{ and } 0° \le \theta \le 180°$$

$$\left.\begin{array}{l}\theta = \arctan x \\ \theta = \tan^{-1} x\end{array}\right\} \leftrightarrow \tan\theta = x \text{ and } -90° < \theta < 90°$$

Definitions



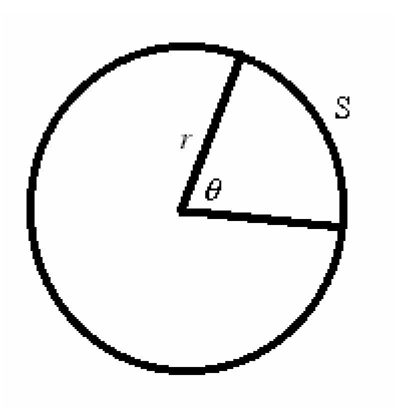
Pythagorean Theorem: $x^2 + y^2 = r^2$

$\sin A = \dfrac{y}{r}$ or $\dfrac{\text{opposite}}{\text{hypotenuse}}$

$\cos A = \dfrac{x}{r}$ or $\dfrac{\text{adjacent}}{\text{hypotenuse}}$

$\tan A = \dfrac{y}{x}$ or $\dfrac{\text{opposite}}{\text{adjacent}}$

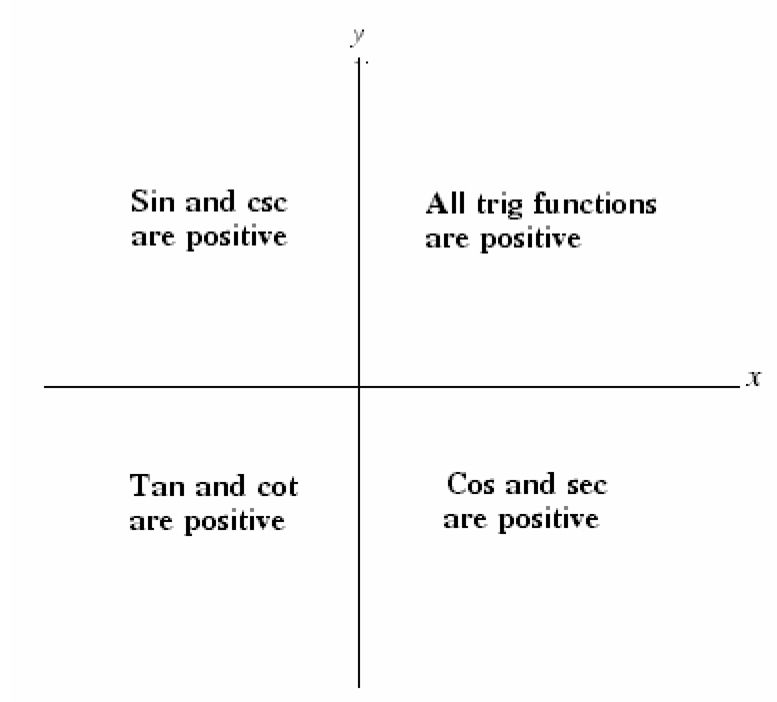
Length of Arc



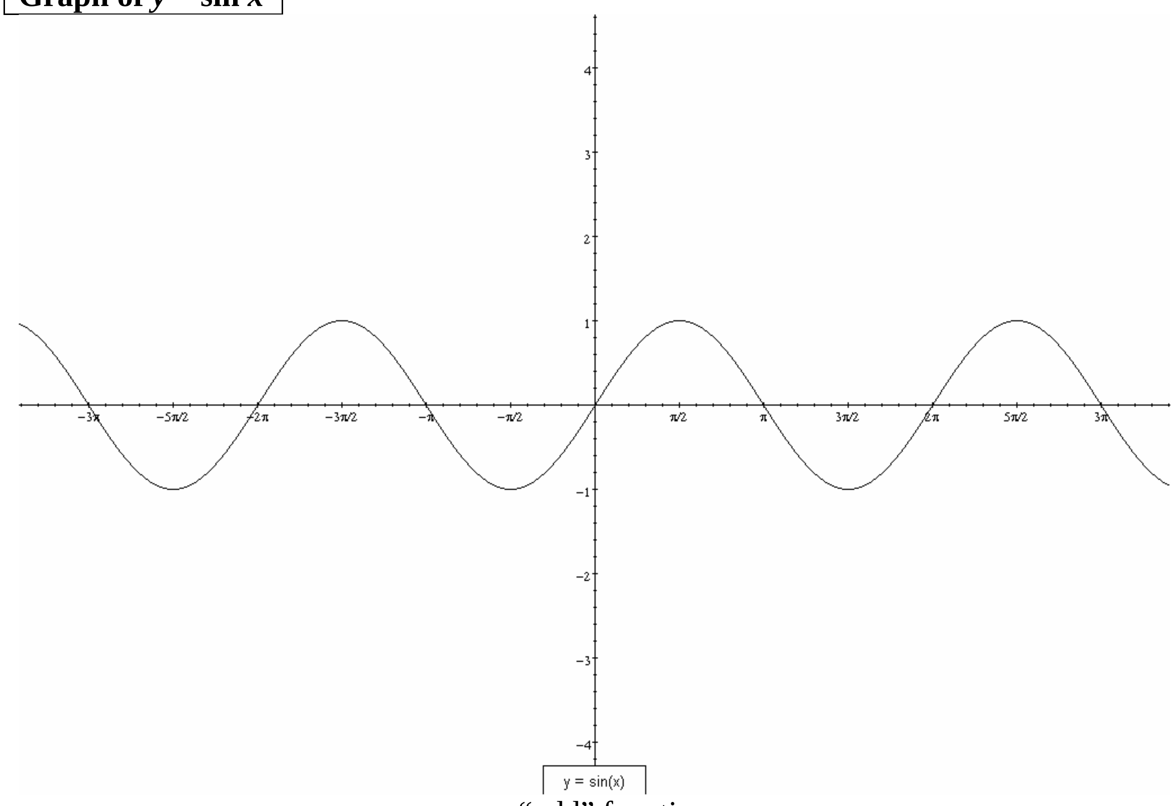
$S = r\theta$

(length of arc = radius $\times$ radians)

Signs of Trig Functions

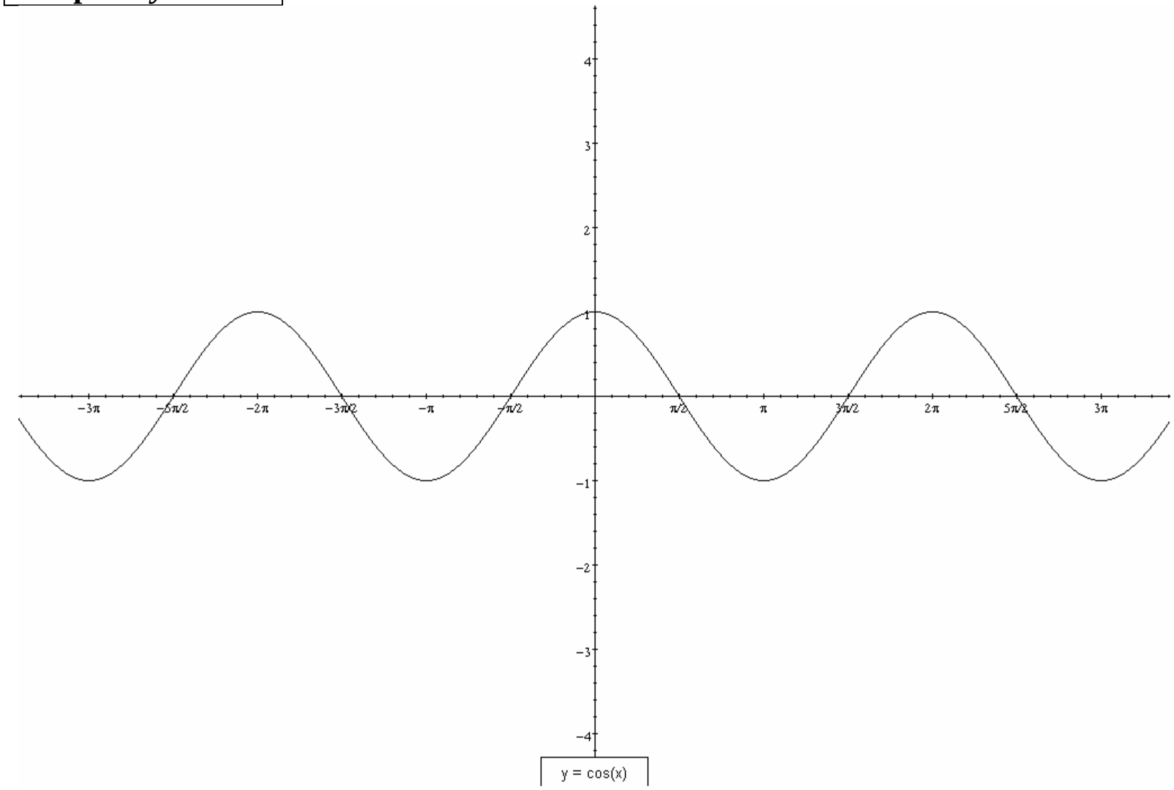


Graph of *y* = sin *x*



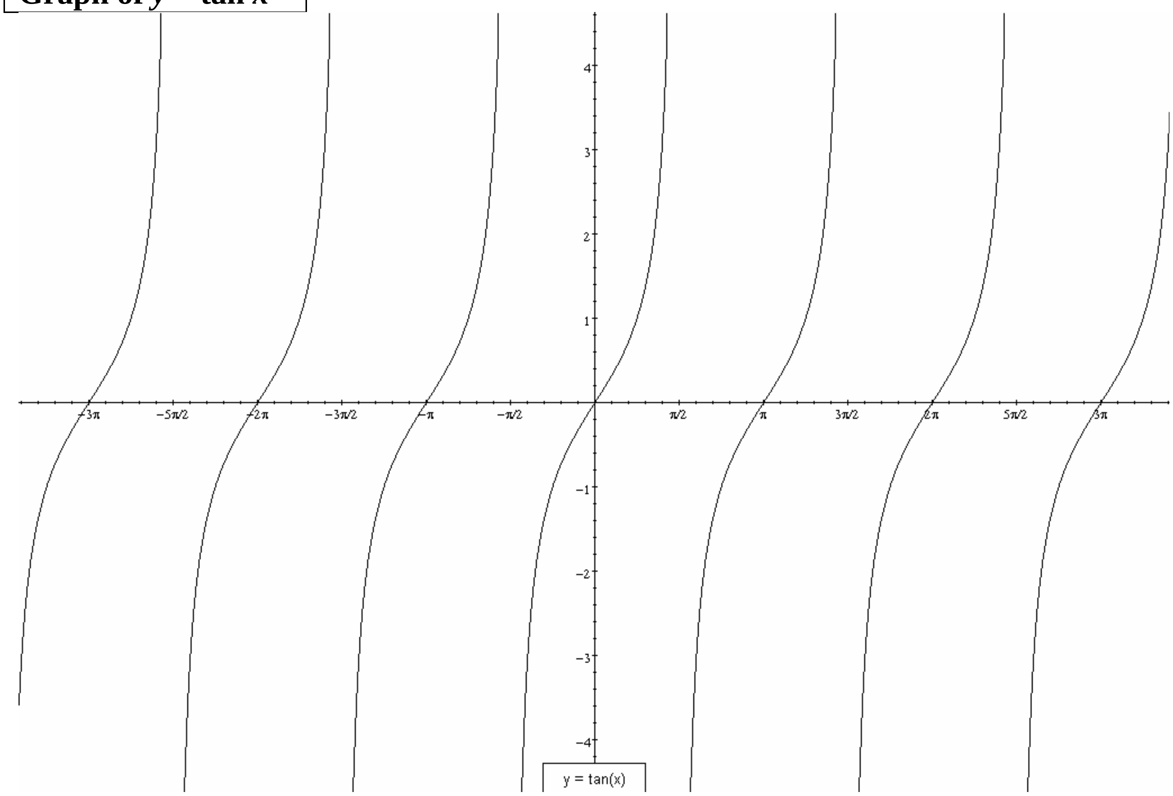
an “odd” function
(origin symmetry)
$\sin(-\theta) = -\sin\theta$

Graph of *y* = cos *x*



an "even" function
(*y*-axis symmetry)
$\cos(-\theta) = \cos\theta$

Graph of *y* = tan *x*



an "odd" function
(origin symmetry)
$\tan(-\theta) = -\tan\theta$